



Newsletter

July - August 2008

INTERNATIONAL REGULATORY DEVELOPMENTS

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EUROPE

Light-duty Euro 5 and Euro 6 Implementing Legislation published

The EU's light-duty Euro 5 and Euro 6 'comitology' (technical details, test methods etc.) was published as Regulation (EC) 692/2008 on 28 July 2008. In addition, two associated documents were published on 19 July – an amending Directive to align the scope for heavy-duty Euro IV and V with the new light-duty Directive and a Commission Communication on the application and future development of Euro 5 and 6.

As anticipated, the introduction of particle number (P#) requirements and the improved (PMP) particulate method and limits occurs after the start of Euro 5. Some OBD requirements are also phased in. This results in a complex set of implementation dates, summarised below. The table shows key dates for M1 (cars) and N1 Class I (essentially car-derived vans).

Emissions stage	OBD stage	Required from		Ends	Notes
		New Types	All Registrations		
Euro 5a ^d	Euro 5	1/9/2009 ^a	1/1/2011 ^{a,b}	31/12/2012 ^c	
Euro 5b	Euro 5	1/9/2011	1/1/2013	31/12/2013	
Euro 5b	Euro 5+	1/9/2011	1/1/2014	31/8/2015 ^a	
Euro 6a ^d	Euro 6-	-	-	31/12/2012	CI engines only
Euro 6b	Euro 6-	-	-	31/12/2013	CI engines only
Euro 6b	Euro 6- plus IUPR	-	-	31/8/2015 ^e	CI engines only
Euro 6b	Euro 6	1/9/2014 ^a	1/9/2015 ^a	-	

^a 1 year later for N1 Class II & III, N2. Other dates as for M and N1 class I.

^b 1 year later for M1 and M1G (off-road) "social needs" vehicles with CI engines and meeting N1 class III limits.

^c 31/8/2012 for "social needs" category M1G CI engines to N1 Class III limits.

^d 5mg/km PM limit and without particle numbers.

^e Euro 6- with additional in-use performance requirements runs until 31/8/2015 for M1 & N1 Class 1, 31/8/2016 for N1 Classes II & III, and N2.

Emissions limit values for M1 & N1 Class I are shown in the table below. The Regulation also covers N1 classes II and III and N2, with higher limit values.

M1 and N1 Class I limits	CO	THC	NMHC	NOx	THC + NOx	PM current method	PM to PMP	P#
	mg/km	mg/km	mg/km	mg/km	mg/km	mg/km	mg/km	#/km
Euro 5a								
PI vehicles	1000	100	68	60	-	5.0 (1)	-	-
CI vehicles	500	-	-	180	230	5.0	-	-
Euro 5b								
PI vehicles	1000	100	68	60	-	-	4.5 (1)	-
CI vehicles	500	-	-	180	230	-	4.5	6.0*10E11
Euro 6a								
PI vehicles	Not applicable							
CI vehicles	500	-	-	80	170	5	-	-
Euro 6b								
PI vehicles	1000	100	68	60	-	-	4.5 (1)	TBD (2)
CI vehicles	500	-	-	80	170	-	4.5	6.0*10E11

(1) PI limit for PM only applies to DI vehicles

(2) P# limit for PI engines to be defined by 1/9/2014

The comitology includes revised reference fuels (petrol with 5% ethanol and diesel with 5% FAME biodiesel) and adds requirements for emissions measurement for hybrids and for periodically regenerating devices. The CO₂ and fuel consumption measurements, idle CO and smoke tests that were previously separate Directives, are also incorporated. Widespread use is made of references to UN-ECE

Regulations to provide the detailed test methods. There are new OBD requirements, including monitoring of catalyst efficiency for NOx, of DPF functionality and of malfunctions of gasoline direct injection systems that affect particulate emissions.

Requirements for aftertreatment reagent systems are based on those from the heavy-duty Directive, but with differences in the 'driver inducement' systems. The rules on financial incentives that EU Member States may give are defined in the document.

Future Development of Euro 5 & 6

The Commission Communication on the future development of the Euro 5 and Euro 6 covers:

- PMP (particulate) procedures will be incorporated as soon as possible and particle number limits for spark ignition vehicles will be proposed before Euro 6.
- Confirmation that the Commission will review deterioration factors for Euro 6 diesel cars.
- Initial proposals for OBD thresholds for Euro 6:

Category	Class	Reference mass (RW) (kg)	Mass of carbon monoxide (mg/km)		Mass of non-methane hydrocarbons (NMHC) (mg/km)		Mass of oxides of nitrogen (NOx) (mg/km)		Mass of particulates (PM) (mg/km)		Number of particles (P) (#/km)	
			PI	CI	PI	CI	PI	CI	PI ⁽¹⁾	CI	PI ⁽²⁾	CI
M	-	All	1500	750	100	140	90	140	9	9	-	1.2x10 ¹²
N ₁	I	RW≤1305	1500	750	100	140	90	140	9	9	-	1.2x10 ¹²
	II	1305<RW≤1760	2700	940	130	140	110	180	9	9	-	1.2x10 ¹²
	III	1760<RW	3400	1100	160	140	120	220	9	9	-	1.2x10 ¹²
N ₂	-	All	3400	1100	160	140	120	220	9	9	-	1.2x10 ¹²

Key: PI = Positive Ignition, CI = Compression Ignition.

⁽¹⁾ Positive ignition particulate mass standards apply only to vehicles with direct injection engines.

⁽²⁾ X 2 threshold to be considered once emission limit is set

- A review of the -7°C test limits, including possible introduction of a diesel NOx limit at Euro 6.
- Confirmation that an E75 reference fuel is to be introduced for the -7°C test for flex-fuel vehicles.
- Future review of test cycles and mass limits.

Amendment to Heavy-duty Euro IV and V Directive
Directive 2008/74/EC amends the existing heavy-duty Directives to apply to vehicles with a reference mass exceeding 2610kg, in line with the scope for Euro 5 and 6. It will also cover petrol engines as well as compression-ignition and gas engines. The new provisions apply from 3 January 2009. New Type Approvals can still be granted under the HD Directive for N1, N2 and M2 vehicles with reference mass of less than 2610kg until the Euro 5 date for new Type Approvals, and extensions for such vehicles can be given until the Euro 5 'all registrations' date.

European Parliament's Environment Committee votes on Heavy-duty Euro VI

On Tuesday 15 July 2008, the European Parliament's Environment Committee (ENVI) voted on proposals to amend the Commission's draft Regulation for the Euro VI heavy-duty emissions standard. The Environment Committee is the lead committee on the dossier, and their report will form the basis of the eventual 'first

reading' vote of the full Parliament, due in October. Before that vote, there are expected to be discussions between the Parliament and the Council of Ministers to try to reach an agreement that would allow the early adoption of the proposals.

The Commission's proposed limit for particulate mass of 10mg/kWh was retained by the Environment Committee but an increased NO_x limit of 500mg/kWh (from the Commission proposal of 400mg/kWh) was adopted. On the timing, instead of the fixed introduction dates proposed by the Commission, the Committee voted for a 36-month lead-time for new Type-Approval and a 48-month one for all registrations after adoption of the implementing measures (a second Regulation which will detail test methods etc.). According to the vote, these implementing measures, including methods for particle number measurement, would have to be adopted by 31 December 2009. Providing those dates are met, this would infer application dates of 1/1/2013 (instead of 1/4/2013) for new types and 1/1/2014 (instead of 1/10/2014) for all registrations. An amendment to keep the legislation unchanged for a minimum of 5 years was also adopted.

Commission proposes Regulation on CO₂ from Light Commercial Vehicles

The European Commission has announced that before the end of the year it plans to adopt a proposal for new legislation to reduce CO₂ emissions from light commercial vehicles such as vans and minibuses (M2, N1 and N2 class vehicles). This will complement the proposal on CO₂ from passenger cars that is currently being discussed in Parliament and Council.

An improvement in the fuel efficiency of light commercial vehicles to reach 175g/km CO₂ by 2012 and 160g/km CO₂ by 2015 was identified in a Commission Communication of February 2007. An 'issue paper' discusses the possibility of merging the proposals with those for cars, the cost-effectiveness of the proposed limits, and how long-term targets can be set for light commercial vehicles. It also asks whether mass and footprint are suitable parameters for the 'utility function' that will be used in the calculations.

The document is at http://ec.europa.eu/environment/air/transport/co2/pdf/issue_paper.pdf

Consultation on EU Agricultural Vehicle Regulations

The European Commission has issued a public consultation on a new Framework Regulation for Agricultural Vehicles. The Commission is considering extending the scope of the legislation to all categories of tractors, trailers and towed machinery. It would cover both wheeled and track laying or crawler

tractors (categories T and C respectively). The questionnaire says that to regulate the requirements for exhaust gas emissions of tractors, the Commission intends to use Directive 97/68/EC (as amended) – the Directive on emissions from Non-Road Mobile Machinery (NRMM) - to ensure uniformity of requirements for similar categories of vehicles. Currently, tractor emissions are covered by a separate Directive (2000/25/EC amended by 2005/13/EC) which mirrors the NRMM Directive. A formal proposal will be presented to Council and Parliament in mid-2009, with an Impact Assessment.

EU Environmental Policy Review for 2007

The European Commission has published its 2007 Environmental Policy Review. It is available online from the DG Environment website:

http://ec.europa.eu/environment/pdf/illust_epr.pdf.

The report says that transport is one of the most difficult issues in the fight against climate change and other pollution. It records developments such as light-duty Euro 5 and 6 and heavy-duty Euro VI, legislative proposals on CO₂ emissions and revision of the Fuel Quality and ambient Air Quality Directives. The Green Paper on urban mobility and proposals for a Directive to introduce environmental aspects into public procurement of vehicles are noted.

The document discusses incentive and taxation plans in various countries, including Germany's environmental labelling scheme. It notes that the Flemish government has plans to introduce a "smart" kilometre levy for trucks that could be related to distance travelled, place, time and environmental characteristics of the vehicle. Another note records that in 2009 Slovakia will introduce a tax based on distance driven, while taking into account the environmental performance of the vehicle and the number of axles.

Commission requests PM₁₀ Information from Member States

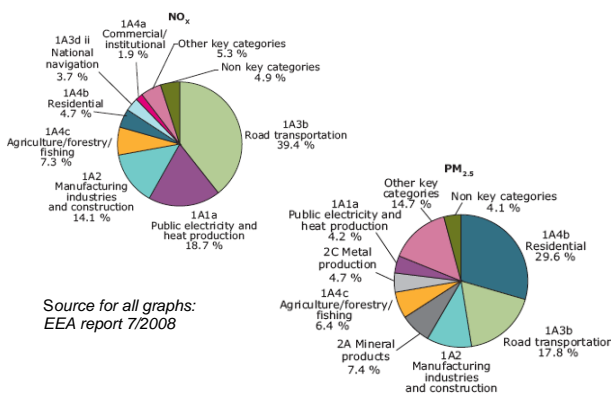
The Commission has written to the 23 Member States that notified exceedances of the PM₁₀ limit value in 2006, asking them to provide information on the measures they are taking to achieve compliance with PM₁₀ Air Quality Standards. The Commission could launch infringement proceedings against those still failing to meet PM₁₀ limits, but Member States can be given extra time to comply under the new Air Quality Directive. Requests for derogations must be submitted by 31 October 2008. The Netherlands has already made such a demand (see later article).

Commission package on 'Greening Transport'

On 8 July 2008 the European Commission put forward a "Greening Transport" package of initiatives intended to steer transport towards sustainability. The package's main element is a legislative proposal revising the "Eurovignette" directive on infrastructure-charging for heavy goods vehicles. It will establish a framework to enable Member States to calculate and vary tolls according to the air and noise pollution from traffic emissions and peak-hour congestion levels. There is a common framework to consider all external costs including climate change, local pollution, noise and congestion. The draft revisions would extend the rules from only the Trans-European Network roads to other types of road such as interurban roads.

Road Transport remains a Major Pollution Source

Road transport continues to be a major source of air pollution in Europe, according to emissions data published in a report from the European Environment Agency on 28 July 2008. The sector is the most significant source of NO_x, CO and non-methane volatile organic compounds, and the second largest emitter of large and fine particulate matter emissions.



The report covers emissions of the main air pollutants during the period 1990-2006. It says that emissions continue to fall across the EU. Levels have dropped sharply since 1990 but reductions have been more modest in recent years particularly for pollutants such as nitrogen oxides, EEA stresses. The agency says that pollution levels remain a concern in urban areas. Particle emissions are a specific problem. Levels fell by around 10% in the EU-27 between 2000 and 2006, but several countries, including Germany, are struggling to meet EU ambient concentration limits.

Source: Annual European Community LRTAP Convention emission inventory report 1990-2006; EEA Technical Report No. 7/2008. ISSN 1725-2237.
http://reports.eea.europa.eu/technical_report_2008_7/en/LRTAP-Convention-final_for_www.pdf

European Court of Justice backs demand for Local Plans to meet PM Limits

The European Court of Justice (ECJ) has ruled that citizens can force local authorities to draw up short-term action plans to control particulate matter. German courts had previously said there was no obligation under German law for an authority to draw up an anti-pollution action plan but the ECJ has now said that EU environmental rules do allow for such measures. However EU states would be obliged only to take short-term measures capable of reducing to a minimum the risk that pollution thresholds may be exceeded and of ensuring a gradual return to a level below that threshold, the court said. An ECJ ruling is applicable across the EU.

Netherlands requests EU delay to PM₁₀ Air Quality Requirements

The Dutch government has requested European Commission clearance to postpone implementation of ambient concentration limits for PM₁₀ until mid-2011 and for NO₂ to 2015 under the new EU Air Quality Directive rules. A reply is due within nine months. Nearly €2bn has been earmarked for national and local measures in a comprehensive air quality programme designed to meet the delayed deadlines. The available budget includes €555 million for generic measures such as soot filters for diesel engines and for research into innovative measures.

Positive Initial Results from the London Low Emission Zone

Around one third of trucks over 12 tonnes operating in Greater London are significantly cleaner than they were one year ago, according to the first monitoring report from Transport for London (TfL) examining the impact of the city's Low Emission Zone (LEZ).

The required emissions standard in the Low Emission Zone is the Euro III standard for particulate matter. The report shows that 96% of vehicles affected by the first phase of the scheme (trucks over 12 tonnes) are compliant with the emissions standard compared to 70% during 2007. A similar trend in compliance rates was observed in the build up to the second phase of the scheme on 7 July 2008 to include trucks over 3.5 tonnes, buses and coaches. Compliance rates currently stand at 91%. The scale of the benefit on PM10 concentrations increases in proximity both to central London and to individual major roads. It therefore has the greatest impact where the air quality problems are most severe, and where the bulk of human exposure to poor air quality takes place.

TfL anticipates that the Low Emission Zone will reduce total road traffic-related emissions of PM₁₀ by

up to 6.6% in 2012, with beneficial effects on other pollutants such as NO_x. TfL also expects the LEZ to reduce the area of Greater London with levels of PM₁₀ that exceed the annual mean air quality objective by 5.8% in 2008 and by 14% by 2012. The area with excessive levels of NO₂ levels should shrink by 5% in 2008 and by 20% by 2012.

Over a ten year period, projections suggest that people who would otherwise die prematurely as a result of poor air quality will gain additional life expectancy totalling 5000 years. Over the same period, lower levels of illness would mean a reduction of about 250 000 restricted activity days and more than 300 000 cases where respiratory symptoms are reduced in severity. The report is available from www.tfl.gov.uk/assets/downloads/roadusers/lez/lez-impacts-monitoring-baseline-report-2008-07.pdf

Swiss Campaigners may force Referendum on DPF Fitment and CO₂

Swiss campaigners say they have achieved sufficient support to force a referendum on proposals to force fitment of Diesel Particulate Filters and to set maximum CO₂ limits. The initiators, the Swiss Young Green party, want all new cars to emit less than 250g/km CO₂ and diesel engines to be equipped with particle filters. The Young Green party says it has submitted 120 000 verified signatures to the Swiss Federal Chancellery, who will now check them to ensure the criterion of 100 000 valid signatures necessary to call a referendum is met.

French 2007 Air Quality Review leads to action on Particulates

The French Secretary of State for Ecology announced on 11 July 2008 that the country will adopt measures to further reduce emissions of large and fine particulate matter from households, offices, industry and agriculture. The measures, announced with the 2007 review of air quality in France, will be instituted as part of France's second national plan on health and environment, for consultation this autumn.

The review found that the trends are "encouraging", but there remain concerns on fine particulates and ozone. Between 2000 and 2007, emissions of VOCs fell by 31%, NO_x by 13%, and PM₁₀ by 17%. The Secretary of State said the government will support the EU work on Euro VI emissions standards for heavy vehicles, and will study the most effective ways to accelerate the introduction of particulate filters on cars. In addition, several options are being examined to extend the 'bonus/malus' system to particulate. The government also proposes stricter emission standards for boilers of over 2MW and financial incentives to switch to cleaner heating systems, especially wood-fired heating emitting large amounts of PM_{2.5}.

Particulates, Ozone and other Pollutants affect 53% of Spain

Pointing to an estimated 16 000 premature deaths annually, the environmental group *Ecologistas en Acción* (Environmentalists in Action) have released an annual air quality report (Air Quality in the Spanish State, 2007 Assessment) stating that more than half of Spaniards are breathing polluted air.

According to the report, over 53% of the population is exposed to some form of air pollution. While 48% are breathing coarse particulate matter (PM₁₀), another 21% are affected by nitrogen dioxide (NO₂) and excessive levels of ozone affect rural and suburban areas. The group said that 80% of urban pollution is caused by traffic, with most Spanish cities failing to develop credible plans for reducing traffic pollution.

Hungarian Trabants get a Reprieve

Hungary's Government has ruled that communist-era 2-stroke cars can stay on the road until 2020 without catalytic converters, extending the original 2008 deadline. The decree published in the official gazette *Magyar Kozlony* affects Trabant and Wartburg cars and Barkas minibuses and vans, the national news agency *MTI* said. There are an estimated 40 000 "Trabis" still running in Hungary.

NORTH AMERICA

Scientific Assessment for NO_x

The US Environmental Protection Agency has released the final "Integrated Science Assessment for Oxides of Nitrogen - Health Criteria", EPA's latest evaluation of the scientific literature on the potential adverse human health effects resulting from exposures to oxides of nitrogen, particularly NO₂. EPA says there are significant new health data, particularly epidemiological studies, since the last scientific review document released in 1993.

The report says that new evidence confirms that short-term NO₂ exposure is associated with increased airway responsiveness, often accompanied by respiratory symptoms, particularly in children and asthmatics. It is not possible to discern whether effects are attributable to average daily (or multiday) concentrations or high, peak exposures. The available evidence was inadequate to infer the presence or absence of a causal relationship for morbidity and mortality effects related to long-term NO₂ exposure.

The report concludes that it is difficult to determine the extent to which NO₂ is independently associated with respiratory effects or if NO₂ is a marker for the effects of another traffic-related pollutant or mix of pollutants. The report is available at <http://www.epa.gov/ncea> under "Recent Additions."

Transport Canada publishes Final Rules on Zero-Emission, Low-Speed Vehicles

On 6 August 2008, Transport Canada published final regulatory amendments intended to permit the sale in Canada of small, battery-powered, low-speed trucks. The changes update the definition of "low-speed vehicle" to include small trucks, harmonising Canada's approach with that of the United States. However, the Canadian regulations maintain the distinct principle that low-speed vehicles must produce no emissions, reinforced by a requirement that they must not use fuel as an on-board source of energy.

Clean Truck Programme for the Port of Los Angeles

The Clean Truck Programme for the Port of Los Angeles has been signed into law. This programme affects some 16000 trucks serving the port. It requires them to meet tough emissions standards but it also sets incentives and fees for clean vehicles. By 2012, trucks serving the port will need to be replaced or retrofitted to meet 2007 emissions standards.

California Guidelines on Air Quality for New Funding Programmes

The California Air Resources Board (CARB) has issued a staff report on proposed air quality guidelines for two new incentives programmes intended to fund air quality and greenhouse gas improvement projects and to develop and deploy alternative and renewable fuels and new vehicle technologies.

The proposed guidelines set standards that the funding agencies (CARB and the Energy Commission) will use for their initial evaluation of potential projects for incentive funding under the Air Quality Improvement Programme and the Alternative and Renewable Fuel and Vehicle Technology Program. The guidelines require the air quality impacts of each potential fuel or vehicle technology project to be evaluated by comparing it with the conventional fuel or vehicle that it would replace. Generally, if the potential project results in emissions that are equal to or less than the baseline technology, it will pass that part of the analysis and may be eligible for further consideration to receive funding. The evaluation procedures also require that funding agencies ensure that projects will comply with all applicable air pollution and fuel requirements.

California Greenhouse Gas Emissions Reduction report includes Black Carbon.

The California Air Resources Board has issued a report on reducing non-CO₂ greenhouse gas emissions (www.arb.ca.gov/research/apr/past/05-328.pdf) that includes a section on Black Carbon (BC) from

mobile sources. The report lists Diesel Particulate Filters (DPFs) and catalysed DPFs as key technologies to remove Black Carbon. It also says that proper maintenance, engine modifications and biodiesel can have an effect, although the effectiveness of all options is described as 'variable'.

US Court Rejects EPA Rule on Power Plant Pollution

A US Federal appeals court has ruled that the Environmental Protection Agency (EPA) went beyond its authority to create the Clean Air Interstate Rule, which used a trading scheme among utilities to reduce emissions of SO₂ and NO_x at power plants. The US Circuit Court of Appeals for the District of Columbia found the EPA used a flawed approach in developing the CAIR rule and said the regulation had to be withdrawn. The rule, issued by EPA in March 2005, aimed to cut power plant emissions of sulfur dioxide and nitrogen oxides by about 70% by 2015.

US EPA issues Greenhouse Gas Proposal

On 11 July 2008, the US Environmental Protection Agency (EPA) issued an Advanced Notice of Proposed Rulemaking covering greenhouse gas emissions. The document seeks public comments on a wide variety of issues associated with greenhouse gas emissions from both mobile and stationary sources but does not make any recommendations for new regulations. Despite last year's Supreme Court decision that the law gives EPA the authority to address greenhouse gases, the EPA Administrator says in the document that the US Clean Air Act is not well suited to dealing with issues around global warming. EPA believes that Congress should instead develop comprehensive climate change legislation.

EPA also raised concerns that the National Highway Traffic Safety Administration (NHTSA) is significantly underestimating the benefits of reducing greenhouse gases in their draft environmental impact statement issued to support the proposed rule to boost vehicle fuel economy standards between 2011 and 2015.

US Grants for Clean Diesel Technologies

The US Environmental Protection Agency (EPA) has announced that it plans to award \$3.4 million (€2.1 million) in grants for projects using emerging technologies to reduce emissions from existing diesel engines. The grants will be administered by EPA's National Clean Diesel Campaign (see March-April 2008 AECC Newsletter). The first three qualifying technologies are a marine engine upgrade and urea-based selective catalytic reduction (SCR) systems for on-highway and non-road applications.

Arizona announces Retrofit Project for Cross-border Trucks

The Arizona Department of Environmental Quality has announced a project to reduce diesel emissions near the Arizona-Mexico border. The Nogales area is in a valley where pollutants can be trapped in an inversion layer, and is especially susceptible to particulate pollution. 30 diesel trucks that cross the border several times a day will be retrofitted with Diesel Oxidation Catalysts at no charge to the owner in a project funded by the US EPA.

New Jersey revises Rules for Stationary Sources

The New Jersey Department of Environmental Protection is proposing new rules and amendments to control air pollution by volatile organic compounds (VOCs), oxides of nitrogen (NOx), particles from combustion of fuel and sulfur in solid fuels. The changes are intended to help New Jersey meet the Federal National Ambient Air Quality Standards (NAAQS) for ozone and PM_{2.5}. The proposals will affect 13 source categories of emissions including stationary combustion turbines, industrial/commercial boilers and those serving electric generating units, municipal incinerators, and glass manufacturing furnaces. The rules are expected to come into operation around 1 May 2009.

SOUTH AMERICA

Chile proposes Measures to Clean Up Santiago's Polluted Air

Chile's National Environment Commission (CONAMA) has presented a series of measures to help clean up the air in the smog-prone capital of Santiago. The Decontamination and Prevention Plan for Greater Santiago was published on 15 July 2008 in the government gazette, the *Diario Oficial*.

Although air quality in Santiago has improved since the mid 1990s thanks to the spread of catalytic converters and use of natural gas, rising traffic levels and restricted gas supplies have led to an increase in the number of days with critical levels of air pollution since 2006. The main requirements of the plan are:

- 15ppm sulfur in diesel and gasoline by Sept. 2011.
- New buses to meet Euro III/EPA 98 with diesel particulate filters (DPFs) in 2009 and Euro IV/EPA 2007 with DPFs in 2012.
- New trucks to meet Euro III/EPA 98 with a Particulate Filter in 2010 and Euro IV/EPA 2007 with a Particulate Filter in 2012.
- Gasoline light-duty vehicles to meet Euro 4/US Tier 2 Bin 8 in 2010 and Diesel light-duty vehicles to meet Euro 5/US Tier 2 Bin 5 in 2011.

- Motorcycles to meet Euro 2/EPA 2006 in 2009, Euro 3/EPA 2010 in 2010.
- OBD requirements to be set for all new vehicles.
- Incentives for zero and ultra-low emission vehicles will be set during next year.

Outlining the plan, regional government head Alvaro Erazo said the number of vehicles with catalytic converters allowed on the roads during critical episodes will be doubled from 20% to 40% (selected according to the last digit of the vehicle's number plate) starting next year. In addition, vehicles will be required to replace their catalytic converters if they are more than 10 years old. The government also plans to improve public transport buses; buses which currently meet Euro II standards will be fitted with particle filters by 1 September 2009, while 253 buses that meet Euro I standards will be withdrawn from service.

Bogota takes action on Pollution

Bogota has inaugurated the city's first mobile air pollution analysis vehicle. The vehicle is equipped to detect ozone, nitrogen oxides, carbon monoxide, sulfur dioxide and particles smaller than ten microns in diameter (PM₁₀). The city also plans to launch a new pilot programme which will send environmental enforcement officials to repeatedly visit companies in violation of pollution regulations in highly industrial sectors; it will require that businesses meet environmental norms or face being shut down.

In some of these sectors, which have about 2 million residents, average airborne concentrations of PM₁₀ are nearly 100µg/m³, about twice the internationally accepted standard and well above Colombia's health standard of 70µg/m³.

ASIA-PACIFIC

India publishes new Emissions Standards

The Indian Ministry of Shipping, Road Transport and Highways has issued notification of amendments to most Indian emissions standards. The notification shows Type Approval limits, Conformity of Production limits, durability requirements, Deterioration Factors, reference and commercial fuel specifications and, for light-duty vehicles, OBD Threshold Limit Values.

The notification from the Gazette of India is on the Department of Road Transport & Highways website: <http://morth.nic.in/writereaddata/sublinkimages/GE522774676141.pdf>. The main requirements are shown below.

For 2 and 3-wheelers, the Bharat Stage III emissions limits, applicable from 1 April 2010 will be:

g/km	CO	HC+NOx	PM
Gasoline			
2-wheelers	1.0	1.0	-
3-wheelers	1.25	1.25	-
Diesel			
2- & 3-wheelers	0.50	0.50	0.05

For light-duty vehicles, Bharat Stage IV will apply from 1 April 2010 for the National Capital Region, Mumbai, Kolkata, Pune, Chennai, Bangalore, Hyderabad, Ahmedabad, Surat, Kanpur and Agra.

g/km		CO	HC	NOx	HC+NOx	PM
Gasoline						
Category M	All	1.00	0.10	0.08	-	-
Category N1 & N	RW≤1305	1.00	0.10	0.08	-	-
	1305<RW≤1760	1.81	0.13	0.10	-	-
	1760<RW	2.27	0.16	0.11	-	-
Diesel						
Category M	All	0.50	-	0.25	0.30	0.025
Category N1 & N	RW≤1305	0.50	-	0.25	0.30	0.025
	1305<RW≤1760	0.63	-	0.33	0.39	0.04
	1760<RW	0.74	-	0.39	0.46	0.06

Not applicable for vehicles designed to carry more than six occupants including driver or whose maximum mass exceeds 1500kg.

Engines for heavy-duty vehicles must meet the following limits, also from 1 April 2010.

g/kWh	CO	HC	NMHC	CH ₄	NOx	PM
Diesel						
ESC test	1.5	0.46	-	-	3.5	0.02
ETC test	4.0	-	0.55	-	3.5	0.03
CNG or LPG						
ETC test	4.0	0.50	0.55	1.1	3.5	-

Bharat (Trem) Stage III A applies to agricultural tractors in two steps. For tractors below 37kW the requirements start from 1 April 2010. For tractors of 37kW and above, the requirements start on 1 April 2011. The test cycle is the ISO 8 mode C1 cycle.

g/kWh	Applicable from	CO	HC+NOx	PM
< 8 kW	1/4/2010	5.5	8.5	0.8
8 ≤ kW < 19		5.5	8.5	0.8
19 ≤ kW < 37		5.5	7.5	0.6
37 ≤ kW < 56	1/4/2011	5.0	4.7	0.4
56 ≤ kW < 75		5.0	4.7	0.4
75 ≤ kW < 130		5.0	4.0	0.3
130 ≤ kW < 560		3.5	4.0	0.2

Actions in Delhi and Mumbai

The Delhi government State Government has issued a draft notification according to which all ten-year-old commercial vehicles plying on Delhi roads as well as those going in and out of the National Capital Region will be banned. Local buses will be allowed to ply on the roads only if they comply with the CNG norms.

Mumbai is expected to be the first Indian city to begin traffic restriction on the basis of number plate after the courts directed the Transport Commissioner to file an affidavit explaining how the State would implement the long-planned scheme.

Japan to offer Clean Diesel Incentives

The Japanese Ministry of Economy, Trade and Industry (METI) has told *Reuters* that as part of their efforts to reduce CO₂ emissions, Japan is looking to introduce incentives for consumers buying clean diesel cars, starting in April 2009. The incentives will apply to diesel-engine cars that meet the tighter emissions regulations on NOx (0.08g/km) and PM (0.005g/km) to be introduced in October 2009.

Beijing bans High-Emission Cars

Beijing took 300 000 high-emission cars off its roads on 1 July 2008, as one of the measures to clean up the capital's air ahead of the Olympics. The 'yellow grade' cars, which fall short of the city's benchmark emissions standards, were banned from Beijing's roads until 20 September 2008. The authorities also banned trucks, tractors, and other "low-speed cargo vehicles" from entering Beijing municipal limits from neighbouring provinces.

Beijing claimed to have already taken 50% of government cars off the roads, and banned private cars on alternate days from 20 July 2008, depending on whether their number plates end in odd or even numbers. The authorities expected that the measures would take 45% of the city's 3.29 million cars off the roads and reduce car emissions by 63%.

Greenpeace assesses Beijing Air Quality

Greenpeace has given Beijing a mixed assessment on air quality. It noted energy-saving technology in Olympic venues, stricter vehicle emissions standards and expanded public transport. But Greenpeace warned that air pollution, especially particulate matter, remains a long-term problem. The city's PM₁₀ levels have consistently stayed above Chinese national standards and stricter World Health Organisation (WHO) standards, Greenpeace said in an assessment of air quality for the Beijing Games. Greenpeace also noted that Beijing does not officially collect statistics on smaller particulate matter and ozone. A city environment official has said that air quality has improved, with a 20% cut in CO, NO₂ and particulate matter since the same time last year.

Tasmanian Bus Fleet moves to Euro V

Tasmanian bus operator Metro is taking delivery of the first of 12 new Euro V diesel buses to reduce exhaust emissions. Metro says it is one of the first in Australia to introduce Euro V buses and the diesel engines are "as clean as compressed natural gas engines that are used in mainland capital cities."

Taiwan introduces Biofuels

Diesel fuel sold throughout Taiwan must contain at least 1% biodiesel under a rule that took effect on 15 July 2008. Recycled cooking oil will be the main source, according to the Ministry of Economic Affairs (MOEA). Taiwan annually generates more than 30 million litres of waste cooking oil, which is sufficient to meet demand for the switch to B1. Fuel providers will have a three-month transition period to replace regular diesel with the B1 blend at all oil stations.

In addition, starting in 2011, all fuel stations in Taiwan will offer petrol containing 3% bioethanol (E3),

according to the ministry. Taipei City government vehicles have used E3 since September 2007. In Taipei and Kaohsiung, two of the island's largest cities, more than 500 buses have been running on B2 (a blend of 2% biodiesel and 98% diesel fuel) and B5 diesel blends since January 2007. The government plans to make B2 diesel available nationwide in 2010.

China reforms Car Sales Tax

China is reforming its car sales tax from 1 September 2008 to encourage the take up of smaller cars. The Ministry of Finance says that the tax rate on cars with engines of 1.0 litre or less will be reduced from 3% to 1%, whilst that on engines over 3 litres will increase from 15 to 25% and over 4 litres from 20 to 40%. The rates for cars of 1 to 2 litres and 2 to 3 litres will remain unchanged at 5% and 9% respectively.

AFRICA

Tanzania plans for 300 Natural Gas Cars

Tanzania plans to have about 300 cars retrofitted with bi-fuel petrol / compressed natural gas systems in Dar es Salaam by March 2009. The Tanzania Petroleum Development Corporation plans to build three gas filling stations in the same period. The country is trying to use its substantial proven natural gas deposits to minimise the effects of high international fuel prices.

MIDDLE EAST

United Arab Emirates to ban Old Vehicles

The United Arab Emirates has announced that Services Ministerial Council decision No 1/32 for 2008 will result in the removal from the country's roads of some 67 000 light vehicles that are at least 20 years old from January next year. Vehicles which are 15 years and older will be taken off the roads in 2010. Transfer of the registration of light vehicles aged 10 years or above is banned. Licensed taxis would be allowed to renew their registration only for five years from the date of production of the car. Vintage and classic cars have been exempted from the new rules.

Dubai extends Trials of Hybrid Taxis and Use of Low-sulfur Diesel for Buses

The Dubai Public Transport Agency has announced that trials of hybrid taxis are to be extended beyond December 2008. Ten hybrid taxis are currently undergoing long-distance validation tests. At the time of the pilot phase announcement, new double-deck buses fitted with Euro IV standard engines were also inaugurated. There are now plans to replace current buses with new ones fitted with these engines and Euro V engines are being considered. Public buses in Dubai will also use low-sulfur (50ppm) diesel in future.

RESEARCH

US EPA Draft Report links Global Warming to Increased Smog

A draft report published by the US Environmental Protection Agency (EPA) says that "Climate change has the potential to produce significant increases in near-surface (ozone) concentrations in many areas of the US". It said that the seasons in which ozone is a problem could also last longer as a result of higher temperatures. Announcing a public comment period on the draft, which ended on August 25, EPA said it does not represent agency policy "at this stage".

Study on Soot Emissions of Shipping

A study of 96 ships of various types finds that the highest emitters of light absorbing carbon aerosol (soot) from commercial shipping are tug boats, with nearly 1 gram of soot per kg fuel burnt. These boats thus make significant contributions to local air quality in ports. Emissions from cargo and non-cargo vessels appeared to be independent of engine load. Large cargo ships (container ships and tankers) emit about 0.5g of soot per kg of fuel burned when at dock and slightly less when at sea. This level is twice as much as had previously been estimated.

Source: Lack et al, Light absorbing carbon emissions from commercial shipping; *Geophysical Research Letters*, Vol. 35, L13815 (2008), [doi:10.1029/2008GL033906](https://doi.org/10.1029/2008GL033906)

Studies on Health Effects

Persistent Free Radicals on Nanoparticles

Scientists from the Louisiana State University have reported that a previously unrecognised group of air pollutants, which they have designated persistent free radicals (PFRs), form on airborne nanoparticles and other fine particle residues when gases cool in, for example, automotive exhaust pipes. The researchers suspect that once these stable PFRs are inhaled, they are absorbed into the lungs and other tissues where they contribute to DNA and other cellular damage. However, the researchers stress that additional work is necessary before definite links can be established.

Source: Dellinger, Dioxins, nanoparticles, environmentally persistent free radicals and combustion-generated air pollution; *American Chemical Society National Meeting*, 20 August 2008, ACS 236 PRES 1.

Diesel Nanoparticles inhibit Lung Function

A new molecular dynamics simulation study by the University of Michigan shows that carbonaceous nanoparticles emitted by diesel engines and other combustion sources can get trapped in the lungs and inhibit the function of lung surfactant. This is believed to be the first time researchers have demonstrated how these nanoparticles can get caught in the lungs and affect the behaviour of surfactant. Other studies have shown that build-up of nanoparticles in the lungs

can lead to inflammation, blood clotting and changes in breathing and heart rates.

Source: Violi, A, Lipid membrane uptake of carbonaceous nanoparticles from combustion sources, *American Chemical Society National Meeting*, 20 August 2008, ACS 236 ANYL 340.

Ultrafine Particles and Cardiovascular Damage

A 'State-of-the-Art' review paper on links between ultrafine particles and cardiovascular health says recent epidemiologic studies show that increased levels of air pollutants are positively associated with cardiovascular morbidity and mortality.

Source: Simkhovich et al, Air Pollution and Cardiovascular Injury; *J Am Coll Cardiol*. doi:10.1016/j.jacc.2008.05.029.

Living near Highway tied to Adverse Birth Outcomes

Researchers in Quebec found that mothers residing within 200 meters of a major highway were 14% more likely to deliver prematurely and 17% more likely to have a low birth weight baby compared with those residing further away. However, in the wealthiest neighbourhoods, living near a highway was associated with higher odds of pre-term birth and low birth weight babies. The authors suggest that less affluent mothers are more likely to be exposed to other common risk factors during their pregnancy, so the effects of living near a highway may not be as significant as amongst affluent mothers.

Source: G n reux et al, Neighbourhood socioeconomic status, maternal education and adverse birth outcomes among mothers living near highways; *Journal of Epidemiology and Community Health*, 2008;62:695-700; doi: 10.1136/jech.2007.066167.

EPA to study Impacts of Nanoparticles on Brain

The US Environmental Protection Agency has awarded a grant to the University of Kentucky for a 4-year research programme to investigate how the sizes and shapes of nanoparticles affect their ability to enter the brain. The results should define the rate of entry of those particles that most rapidly enter the brain and the cells most susceptible to adverse effects.

Source: [Safety/Toxicity Assessment of Ceria \(A Model Engineered NP\) to the Brain](#); US-EPA Grant Number R833772.

Studies on Ambient Particulate

Study on PM Variation within an Area

A study from California investigates variations in particulate matter in an urban area impacted by different local and regional sources. High spatial variability was observed for many elements associated with motor vehicle emissions but mass and organic carbon were homogeneously distributed over the sites. The authors say this is evidence that epidemiological studies using only PM concentrations from central sites may not accurately assess exposure to toxicologically relevant PM components.

Source: Krudysz et al, Intra-community spatial variation of size-fractionated PM mass, OC, EC, and trace elements in the Long Beach, CA area; *Atmospheric Environment* Vol. 42 Iss. 21. July 2008, pages 5374-5389. doi: 10.1016/j.atmosenv.2008.02.060.

Canadian Study on Particulate Exposure

In a study from Canada, an instrumented bicycle was used to determine particulate matter exposures along routes passing through a variety of land uses in a traffic-dominated urban setting. Mean concentrations varied between 7 and 34 $\mu\text{g}/\text{m}^3$ for PM_{2.5} and between 26 and 77 $\mu\text{g}/\text{m}^3$ for PM₁₀. Meteorological factors were responsible for significant day-to-day variability and on individual days, land use and proximity to traffic significantly affected exposure.

Source: Thai, McKendry & Brauer, Particulate matter exposure along designated bicycle routes in Vancouver, British Columbia; *Science of the Total Environment*, doi:10.1016/j.scitotenv.2008.06.035

GENERAL

AECC Diesel Retrofit Website

AECC is pleased to announce the launch of a new website dedicated to retrofit for heavy-duty vehicles.



The site provides information on state-of-the-art technologies to reduce pollutant emissions from existing heavy-duty diesel engines. It also features a map with information and links to incentives schemes and projects throughout Europe. A News section disseminates developments on air quality and retrofit activities in Europe.

We invite you to visit www.dieselretrofit.eu.



We hope you will find this a useful information source. If you have comments or suggestions for improvement of the dieselretrofit.eu website, please let us know. As the momentum around retrofit is growing, we will add additional details on new incentives schemes and projects as they become available.

FORTHCOMING CONFERENCES

FISITA 2008 World Automotive Congress

14-19 September 2008, Munich Germany

Details at www.fisita2008.com

The topic areas include strategies for future ultra-low exhaust emissions limits, engines for future fuels and harmonisation of international legislation.

Decarbonising the Automotive Industry: Emissions Compliance and the Pursuit of Greener Vehicles

16 September 2008, London, UK

Details at www.awbriefing.com/events/160908.html

The 2008 European Transport Forum

16-18 September 2008, Brussels, Belgium

Details at www.europeantransportforum.eu/

A series of 3 high level seminars, focusing on urban mobility, road safety and transport & the environment.

Gas-Powered Vehicles – The Key Technology on the Road to the Emission Free Propulsion of the Future?

17-18 September 2008, Berlin, Germany

Details at www.iav.com

The conference offers presentations on the latest technical developments but also the opportunity for comparison drives on the test track at ADAC's Driving Safety Centre in Berlin-Brandenburg.

CIMAC Circle 2008

25 September 2008, Hamburg, Germany

Details at www.cimac.com

New challenges for the marine industry are coming up due to the tightening of IMO regulations for NOx and SOx, having also an influence on marine fuel qualities. This CIMAC Circle will provide experts views of future marine diesel engine scenarios.

7th International Motorcycle Conference

6-7 October 2008, Cologne, Germany

See www.ifz.de/e-events-conferences-7intmotorcycle.htm

Environmental aspects to be covered are motorcycle emissions, standards and measurement procedures.

17th Aachen Colloquium "Automobile and Engine Technology"

6-8 October 2008, Aachen, Germany

Details at www.aachener-kolloquium.de/index_e.htm

The congress will provide a wide range of technical presentations addressing current challenges of the vehicle and powertrain industry.

SAE 2008 Powertrains, Fuels & Lubricants

6-9 October 2008, Rosemont, Illinois, USA

Details at www.sae.org/pfs

More than 200 papers and presentations by top researchers will address advancements in conventional spark ignition and compression ignition technologies and the future of alternative fuels.

SAE 2008 Commercial Vehicle Engineering Congress and Exhibition

7-9 October 2008, Rosemont, Illinois, USA

Details at www.sae.org/events/cve/

This event will cover all on- and off-road applications for commercial vehicles and include alternative fuels, emissions and global harmonisation.

4th International CTI Forum SCR-System

14-16 October 2008, Stuttgart, Germany

Details at www.car-training-institute.com/scr-system

Ricardo Diesel & Gasoline Engine Seminars

21 & 22 October 2008, Shoreham-by-Sea, UK

Details of both the Ricardo engine seminars are at www.ricardo.com/engineeringservices/technicalsupport.asp?page=technicalseminars

International conference 'Environment & Transport in different contexts'

27-29 October 2008, Ghardaia, Algeria

Details at www.inrets.fr/nojs/services/manif/ghardaia-oct08/index.html

The conference deals with the environment issues related to transport in different areas with a particular focus on the Southern countries. The main topics to be dealt with are transportation systems and environmental impacts, evaluation methodology, control technology and transportation policy.

Near Zero Vehicle Emission Technologies

30 October 2008, Dearborn, Michigan, USA

Details at www.itbgroup.com/conferences_NZEV.htm

Proposed topics include EGR systems, strategies for reducing CO₂, nitrous oxide reduction approaches including SCR, and Diesel particulate filters.

Light-duty Diesel Emissions Control Symposium

3-5 November 2008, Ypsilanti, Michigan, USA

Details at www.sae.org

Experts will discuss and present information highlighting the pathways to emissions compliance and technologies that are under investigation, being demonstrated, and are set to be applied on current and future generations of light-duty diesel engines.

6th FAD Conference: Challenge – Exhaust Aftertreatment for Diesel Engines

5-6 November 2008, Dresden, Germany

Details at www.fad-diesel.de

The issues of climate change, resources stringency, economic growth and future mobility are in the public awareness and influence political decisions, so a comprehensive view of the CO₂ and pollutant emissions caused by combustion engines is necessary. The conference gives the participants the opportunity to be informed on the state of the art and innovations in exhaust aftertreatment.

Better Air Quality BAQ2008

12-14 November 2008, Bangkok, Thailand

Details at www.baq2008.org

The theme "Air Quality and Climate Change: Scaling up win-win solutions in Asia" relates directly to the IPCC recommendation to integrate air quality management & climate change mitigation strategies.

ICAT-08 International Conference on Automotive Technologies

13-14 November 2008, Istanbul, Turkey

Details at www.icatconf.org

The main theme of this conference will be "Alternative Technologies for the reduction of CO₂ emissions". Topics include diesel engine development, durability and emissions, advanced diesel emission controls and gasoline direct injection engines.

China Green Transport Summit 2008

24-25 November 2008, Beijing, China

Details at www.chinagreentransport.com

Co-organised by Tsinghua University and China Association of Automobile Manufacturers, this meeting will focus on current technology application in development of urban transport vehicles, engines and fuels. Key topics include green transport demands of China and the World, developing cleaner and better vehicles for the future, promoting innovation in environmentally friendly energy technologies and opportunities for engine optimization.

Diesel Engine Aftertreatment

27 November 2008, Paris, France

Details at www.sia.fr

Today's regulatory requirements impose the use of dedicated after-treatment systems that are both complex and costly. The technological challenge is to develop systems that are more innovative, less costly, and more fuel efficient.

International CTI Forum NOx-Reduction

2-4 December 2008, Detroit, Michigan, USA

Details at www.emission-control-systems.com

Topics to be covered include the possibilities of reducing NOx for light and heavy diesel engines, engine improvements for NOx reduction, technologies, concepts, strategies and solutions for

NOx reduction through emissions aftertreatment, SCR system components, applications and strategies and urea infrastructure.

16th Annual Handelsblatt Conference 'The Automobile Industry'

15-16 December 2008, Frankfurt/Main, Germany

Details at <http://vhb.handelsblatt.com/automobil>

Speakers include Wolfgang Tiefensee (German Federal Minister of Transport, Building and Urban Affairs), Philippe Jean (Head of the Automotive Industry Unit of DG Enterprise), Ivan Hodac (Secretary general of ACEA) and Lars Holmqvist (CEO of CLEPA).

7th International CTI Forum Exhaust Systems

26-29 January 2009, Düsseldorf, Germany

Details at: www.exhaustsystems-forum.com

Themes will include emission laws in international comparison, alternative fuels and effects on emissions, worldwide emissions strategy for diesel engines in passenger cars, and current systems to reduce particulate and NOx.

15th Fuels & Lubes Asia

4-6 March 2009, Hanoi, Vietnam

Details will be at www.fuelsandlubes.asia

Green Ship Technology 2009

24-25 March 2009, Hamburg, Germany

Details at www.lloydslistevents.com

CAPoC8 Eight International Congress on Catalysis and Automotive Pollution Control

15-17 April 2009, Brussels, Belgium

Details at www.ulb.ac.be/sciences/cpmct/capoc8

The conference covers all topics related to applications and requirements of catalysis in automotive emissions control - catalyst and sorption technologies, particulate emission control, off-cycle emissions and unregulated pollutants, materials for catalysts, washcoat and fuel-borne catalysts, modelling, on-board reforming of fuels.

Deadline for abstracts is 15 October 2008

SAE 2009 World Congress

20-23 April 2009, Detroit, Michigan, USA

Details at www.sae.org

Challenge Bibendum 2009

26-29 April 2009, Rio de Janeiro, Brazil

Details at www.challengebibendum.com

Challenge Bibendum gathers entrepreneurs, industrialists and scientists, from countries around the globe to share their technologies, visions and roadmaps with policymakers and media.

Additives 2009: Fuels and Lubricants for Energy Efficient and Sustainable Transport

27-30 April 2009, York, UK

Details at www.rsc.org/Additives2009

The meeting aims to provide a multi-disciplinary forum to share ideas for future developments in the science and technology of fuels and lubricants.

5th AVL International Commercial Powertrain Conference

28-29 April 2009, Graz, Austria

Technical sessions will cover emissions compliance, hybrid powertrains, alternative fuels and electronic systems including OBD.

13th ETH Conference on Combustion-Generated Nanoparticles

22-24 June 2009, Zurich, Switzerland

FISITA 2010: Automobiles and Sustainable Mobility

30 May – 4 June 2010, Budapest, Hungary

Details at www.fisita2010.com

The main topics will include environment-friendly vehicles and powertrains, vehicles standards, regulations and legislation and special questions for buses and trucks.

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Eighth International Congress
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The Organising Committee cordially invites you to attend the CAPoC7, which will be held from **Wednesday, April 15th to Friday, April 17th 2009** in Brussels, Belgium

The continuing interest in Catalysis and Automotive Pollution Control (CAPoC) has encouraged us to organise a eighth international congress in this successful series. **Five half-day** sessions starting in the morning of April 15th and ending at noon on April 17th, will give an account of the state of the art in this field and discuss technical perspectives and challenges in relation to present and future legislative regulations. On Tuesday evening, **April 14th**, all CAPoC8 participants are cordially invited to attend a plenary lecture by G. Ertl (Nobel Prize 2007 in chemistry).

PAPERS

Scope:

All topics related to applications and requirements of catalysis in automotive (including cars, light and heavy duty vehicles) emission control will be considered such as

- catalyst and sorption technologies (TWC, cold start emission, lean-burn of gasoline and diesel : SCR, storage and other NO_x emission control)
- particulate emission control
- aftertreatment for gaseous HC, H₂ and renewable fuel mixtures
- off-cycle emissions and unregulated pollutants
- materials for catalysts, washcoat and fuel-borne catalysts (additives)
- modelling of aftertreatment systems and catalyst characterisation
- integrated emission control systems, on-board diagnostics
- on-board reforming of fuels
- sustainable fuel technologies
- innovative technologies (new materials, recovery of precious metals)

Proceedings:

It is intended to publish all accepted papers with no distinction between oral and poster form, as proceedings as proceedings in a distinguished journal related to catalysis. Papers will be peer-reviewed before the conference and respective reports will be made available to authors during the conference at the latest. Papers are limited to ten pages maximum.

Deadlines:

- **October 15th, 2008** : submission of **extended abstracts** (1-2 typewritten pages).
- **December 5th, 2008** : Authors are informed of the **acceptance** of their paper.
- **January 20th, 2009** : Deadline for receipt of the **full manuscript** in order to be sent for review and to appear in the volume of preprints made available to participants at the Congress. The preprints will appear under the authors responsibility.
- **January 31st, 2009** : The **second circular** detailing the final programme, and including information on registration and accommodation, is distributed.

INFORMATION

Format and Language:

A limited number of papers will be presented in full oral form. It is intended to discuss posters in special sessions, after their presentation. Submission must be in English.

Interested applicants are invited to complete the attached **REPLY CARD** and return it to the secretary of the Congress.

Correspondence:

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